PATENT SPECIFICATION

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676,774

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COMPLETE SPECIFICATION

Improvements in or relating to Wheeled Vehicles for Use with Rail Trackways

We, J. BROCKHOUSE & COMPANY, LIMITED, a British Company, of Victoria Works, Hill Top, West Bromwich, in the County of Stafford, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to wheeled vehicles for use with trackways of the kind comprising a track of width corresponding substantially to the gauge of the wheels of the vehicle to be employed, and a central guide rail projecting above the track and adapted to be engaged by guide means on the vehicle so as to restrain the latter against lateral movement sufficient for one or more of its wheels to leave the track.

The invention is intended for use with that particular trackway of the above kind which forms the subject of our Patent Specification No. 642,699, in the Specification of which we have described how with trackways as hitherto constructed the guide rail has been made up from lengths of flat-bottomed rail of section corresponding to that of existing flat-bottomed railway rails, the base of the guide rail being spiked directly to the track so that the guide rail formed a longitudinally continuous projection extending upwardly from the track.

As described in our aforesaid Specification such an arrangement is open to the objection that the guide rail affords a continuous ledge against which drifting snow or sand or rainwashed mud, or similar weather-produced phenomena can rapidly collect, producing drifts extending across the track on one or both sides of the guide rail, which drifts may form to a depth sufficient to cause passing vehicles to cant over to an undesirably large angle, while the drifts may severely obstruct the free passage of the guide means on the vehicle.

This problem of drifting snow, sand, mud or the like is, of course, well known as applied to ordinary railways, in which the underside of the rail, particularly in the case of flat-bottomed tracks, is substantially in contact with the upper surface of the ballast or with longitudinal rail bearers where these are employed, so that drifts form on one or both sides of one or both rails, but by reason of the clearance which exists between the lowest part of the vehicle and the track on either side of each rail on any railway, drifting to quite a substantial depth must take place before any undesirable canting of a passing vehicle can occur.

In the case of a trackway of the above kind, however, the problem is quite different from that obtaining in the case of a railway, as even a slight drifting on the guide rail track on only one side of the guide rail must necessarily lead to a canting of the passing vehicle, the extent of which rapidly increases with increased depth of drift. Furthermore, such drifts can readily interfere with the free passage of the guide means on the vehicle, which guide means usually engages the sides of the guide rail over a greater vertical distance than is the case with the wheel flange on an ordinary railway.

With the foregoing considerations in mind, in our aforesaid Specification we have described as the invention forming the subject of such Patent Specification the disposition of the guide rail above the wheel supporting surface of the track by

[*Price* 2/8]

a distance sufficient to permit of the snow, sand, mud or the like flowing freely or relatively freely between the underside of the rail and the track, thereby reducing substantially the likelihood of drifts forming on either side of the rail, the rail being supported from the trackway by supports spaced apart longitudinally of the rail, and whose dimensions in a direction longitudinally of the rail are small in comparison with the distance between adjacent longitudinally spaced supports.

From the difficulties which the invention of our Specification aforesaid seeks to overcome, it will be seen that there are definite limitations on the maximum vertical depth which can usefully be employed for the guide rail, the lateral sides of which are to be engaged by the guide means on the vehicle.

If this vertical depth is made too great, the lateral sides of the guide rail will present a serious obstruction to drifting snow, sand, mud or similar weather-produced phenomena so that the whole object of the invention of our aforesaid Specification will be nullified.

On the other hand the minimum vertical depth of the guide rail must not be too small or inadequate guiding of the vehicle will result, and there will be serious danger of the vehicle canting laterally through an angle sufficient for the guide means engaging one of the lateral sides of the guide rail to be displaced to a position above the top of the guide rail, with the result that the whole vehicle may be displaced laterally off the track.

Thus, if the objects stated in our prior Specification aforesaid are to be achieved variations in the vertical depth of the guide rail are relatively limited. At the same time for proper guiding of the vehicle against lateral movement, it is, of course, essential that the guide means should be in a position for engaging with each of the lateral sides of the guide rail.

In consequence of wear of the track itself and also of the peripheries of the vehicle wheels or tyres carried thereby, the vertical position of the vehicle itself, including its guide means, is likely to be progressively displaced downwardly in relation to the guide rail with continued use of the vehicle, and unless the vertical depth of the guide means is made very substantial, their upper ends may be displaced below the level of the top of the guide rail, and in consequence of the relatively limited maximum vertical depth of the guide rail which can be provided, the vertical depth of contact between the guide means and the lateral sides of the guide rail may then become insufficient for adequate guiding of the vehicle against lateral displacement.

The provision of guide means having more than certain overall vertical depth may be inconvenient as far as the design of the vehicle itself is concerned.

Furthermore, in consequence of the downward displacement of the guide means together with the rest of the vehicle which occurs after a period of use as above described, the lower end of the guide means may foul stones or other obstructions on the track adjacent one or both sides of the guide rail.

The present invention has for its object the provision of a wheeled vehicle embodying an improved form of guide means which is specially applicable for use with trackways of the particular kind forming the subject of our Patent Specification aforesaid, and in which the disadvantages of existing guide means as applied to existing wheeled vehicles are avoided.

With this object in view, according to the present invention the guide means comprise a pair of laterally spaced guide rollers mounted rotatably upon laterally spaced vertically extending stub axles so that the rollers are adapted to engage with opposite sides of the guide rail, each of said stub axles having a threaded part connected thereto in threaded engagement with a further threaded part operably associated with the vehicle frame, the axis of the screw threads in each case being vertical, the arrangement being such that in the event of wear of the wheel tyres or of the track occurring the interengaging threaded parts can be turned relatively to adjust by an infinite degree within predetermined limits the vertical position of the guide rollers in relation to the vehicle frame so as to maintain the same in the requisite vertical position for guiding engagement with their respective lateral sides of the guide rail.

With such an arrangement by providing a threaded connection between each stub axle and the vehicle frame the height of each guide roller can be adjusted infinitely within predetermined limits in relation to the vehicle frame and the guide rollers can be maintained in the required guiding position irrespective of the limitation of the maximum vertical depth of the guide rail and without likelihood of the lower ends of the guide rollers fouling small obstructions on the track.

We are aware of the fact that a tramroad system for road vehicles and trains

has already been proposed in which the roadway has a wide elevated guide strip interposed between two trackways for the road wheels of the vehicles, the latter being provided with guide rollers mounted to rotate about a vertical axis on vertical shafts so as to engage with opposite sides of the guide strip for the purpose of guiding the vehicles, each such roller carrying shaft being vertically slidable in an arm carried by the vehicle, being capable of being fixed at different levels on such arm with the aid of a pin adapted to be inserted in one of a series of holes spaced apart vertically of the roller shaft so that in such prior arrangement it was not possible to adjust by an infinite degree within predetermined limits the vertical position of the guide rollers in relation to the vehicles on which they are mounted.

It has further been proposed to provide vehicles for running on the track of an ordinary railway in which the vehicles were provided with ground engaging wheels adapted to engage with plain trackways provided at the outer sides only of the rails, the vehicles being restrained against lateral movement relative to the railway rails by pairs of guide rollers, each roller of each pair engaging one of the two railway rails adjacent the inner side of the head thereof, each pair of rollers being supported upon arms mounted for pivotal movement about a horizontal axis, the vertical position of the arms and their associated rollers being infinitely adjustable within predetermined limits by means of suitable mechanism provided in the driving compartment of the vehicle. In such latter prior proposal no central guide rail was provided which was engaged on each of its lateral sides by guide rollers.

The invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of a vehicle for a trackway of the kind hereinbefore specified and embodying guide means in accordance with the present invention.

Figure 2 is a cross sectional side view of one of the guide means.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a part-sectional front elevation of the lower part of the vehicle depicted in Figure 1 and drawn to an enlarged scale and showing in side elevation one of the guide means of Figure 2.

Figure 5 is a part-sectional view on the line 5—5 of Figure 4.

Referring to the drawings, the invention is shown as applied to a trackway forming the subject of our Patent Specification aforesaid, such trackways as more particularly described in such Specification comprising a concrete or other rigid track 10 of width corresponding substantially to the gauge of the wheels of the vehicle to be employed, which vehicle may, for instance, comprise a locomotive as depicted at 11 in Figure 1, the locomotive being provided with pneumatically tyred wheels 12.

The trackway is provided with a central guide rail 13 of rectangular form in cross section and supported at intervals along the length of the rail or track by supporting means 14 so that the underside of the rail is spaced away from the track for the purpose described in the Specification of our Patent aforesaid, the vertical depth of the guide rail being made as small as possible consistent with the requisite guiding property of the rail for the same purpose, that is to say so that the rail offers the minimum resistance to laterally moving snow, sand, mud and other weather - produced phenomena, so that drifting of the same at the guide rail is avoided as far as possible.

The vehicle 11 is provided at its front and rear ends with guide means adapted to engage the opposite vertical sides 15 of the guide rail, such guide means consisting of two pairs of longitudinally spaced rollers 16 disposed at both the front and rear ends of the vehicle, the two rollers in each pair being disposed on opposite sides of the guide rail so as to have guiding engagement with the sides 15 thereof, and being mounted for rotation about vertical axes.

For this purpose each roller, as more particularly shown in Figure 2, is made in two parts consisting of a main roller body 17 of hollow cylindrical form open on its upper side, the hollow interior of the roller accommodating a pair of anti-friction bearings 18, 19 of ball and roller form respectively by which the body 17 is rotatably mounted on an eccentric pin 20 formed integrally and eccentrically with the lower end of a vertical stub axle 21.

Such eccentric pin is provided for the purpose of enabling the distance between the guide rollers themselves to be adjusted in accordance with the invention forming the subject of our Patent Application No. 4086/49 (Serial No. 676,775) of even date.

The lower extremity of the eccentric pin 20 is threaded to receive a securing nut 22, and at the junction between the pin and the stub axle the latter is formed with a cylindrical shouldered part 23 concentric with the axis of the pin 20, against the underside of which the bear-

ing 19 abuts.

The roller body 17 is provided with an annular closure disc 24 having a lubricator 25 for the two bearings 18, 19.

The stub axle 21 is threaded as shown at 26 and has threaded engagement with the interior of one of a pair of bushes 27, which bushes are welded one near each end of one of a pair of longitudinally extending guide plates 28 of elongated rectangular configuration in plan, a pair of which plates are disposed at each end of the vehicle 11, the plates 28 being secured substantially centrally of its length to the underside of the lower cranked portion 29 of the wheel axle 30, the sides 31 of the cranked portion of which axle are vertically slidable between guide plates 32 connected to the vehicle frame 33, the vertical movement of the axle 30, together with that of the guide rollers 16, being controlled in the known manner by springs 34 secured centrally one to each end of the axle 30, the ends of the springs being connected to lugs 35 secured to the guide plates 32.

Each plate 28 is formed with a hole to accommodate a shouldered part 36 of the bush as well as to permit of the stub axle 21 passing therethrough, and the two plates at each end thereof are joined by bracing strips 37.

The upper end of each stub axle is formed with a non-circular head 38 having a kerf 39, thus enabling each stub axle to be rotated within the bush 27, thereby displacing the stub axle vertically in relation to the body frame of the vehicle and effecting corresponding adjustment in the vertical position of the associated guide roller.

In practice such vertical adjustment of the guide roller would be effected by rotating each stub axle through a complete revolution at a time so that the distance between the guide rollers remains unaltered, although if desired the distance therebetween may be adjusted as well in accordance with the invention forming the subject of our Patent Application No. 4086/49 (Serial No. 676,775) of even date.

In order to lock the stub axle in its adjusted position, a lock nut 40 is provided which engages the upper side of the internally threaded bush.

The present invention thus enables the vertical position of the guide rollers in relation to the vehicle and thus in relation to the guide rail to be adjusted to compensate for wear of the track and of the vehicle tyres so as to maintain the guide rollers in the requisite vertical position in relation to the guide rail for optimum guiding, while progressive downward displacement of the guide rollers in consequence of the wear of the track and wheel tyres, leading to the guide rollers fouling obstructions on the track, is avoided.

At the same time the vertical depth of the guide rail can be maintained, as already described, at the minimum value consistent with the guide rail having the necessary guiding characteristics.

The vertical walls of the roller body 17 are made relatively thick as shown in Figure 2, so as to allow for wear of the periphery of the rollers which can be expected to take place during use.

What we claim is:—

1. A wheeled vehicle for the purpose described, characterised in that the vehicle is provided with guide means comprising a pair of laterally spaced guide rollers mounted rotatably upon laterally spaced vertically extending stub axles so that the rollers are adapted to engage with opposite sides of the guide rail, each of said stub axles having a threaded part connected thereto in threaded engagement with a further threaded part operably associated with the vehicle frame, the axis of the screw threads in each case being vertical, the arrangement being such that in the event of wear of the wheel tyres or of the track occurring the interengaging threaded parts can be turned relatively to adjust by an infinite degree within predetermined limits the vertical position of the guide rollers in relation to the vehicle frame so as to maintain the same in the requisite vertical position for guiding engagement with their respective lateral sides of the guide rail.

2. A vehicle according to Claim 1 further characterised in that the stub axles are provided with threaded extensions threadably mounted within internally threaded parts carried by the frame of the vehicle.

3. In a wheeled vehicle for the purpose described, the provision of the said guide means comprising a pair of laterally spaced vertically extending stub axles, a guide roller mounted for rotation on each of said stub axles with the guide rollers disposed in laterally spaced relationship, said rollers being adapted for rolling engagement with opposite sides of the guide rail, means for retaining each guide roller on its associated stub axle, said stub axles being threaded externally, a pair of bushes carried by said vehicle, each of said stub axles having threaded engagement with the interior of one bush, and means for rotating each stub axle relative to its associated bush to adjust its associated roller vertically in

relation to said vehicle.

4. A vehicle according to any of the preceding Claims, further characterised in that provision is made for adjusting the distance between the peripheries of the two rollers.

5. In a wheeled vehicle for the purpose described, the provision of the said guide means comprising a pair of spaced vertically extending stub axles, eccentric pins on the lower end of each stub axle having their axes eccentric in relation to the axes of their respective stub axles, a guide roller mounted for rotation on each of said eccentric pins so that the two rollers rotate about laterally spaced vertical axes, said guide rollers being adapted for rolling engagement with opposite sides of the guide rail, means retaining each guide roller on its respective eccentric pin, said stub axles being threaded externally, a pair of bushes carried by said vehicle, each of said stub axles having threaded engagement with the interior of one bush, and means for rotating each stub axle relative to its associated bush to adjust its associated roller vertically in relation to said vehicle.

6. In a wheeled vehicle for the purpose described, the provision of the said guide means constructed substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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PROVISIONAL SPECIFICATION

Improvements in or relating to Wheeled Vehicles for Use with Rail Trackways

We, J. BROCKHOUSE & COMPANY, LIMITED, a British Company, of Victoria Works, Hill Top, West Bromwich, in the County of Stafford, do hereby declare the nature of this invention to be as follows:—

This invention relates to wheeled vehicles for use with trackways of the kind comprising a track of width corresponding substantially to the gauge of or distance between the wheels of the vehicle to be employed, and a central guide rail projecting above the track and adapted on each of its lateral sides to be engaged by guide means on the vehicle so as to restrain the latter against lateral movement sufficient for one or more of its wheels to leave the track.

The invention is intended for use with that particular trackway of the above kind which forms the subject of our patent Specification No. 642,699 in the provisional specification of which we have described how with trackways as hitherto constructed the guide rail has been made up from lengths of flat bottomed rail of section corresponding to that of existing flat bottomed railway rails, the base of the guide rail being spiked directly to the track so that the guide rail formed a longitudinally continuous projection extending upwardly from the track.

As described in our aforesaid specification such an arrangement is open to the objection that the guide rail affords a continuous ledge against which drifting snow or sand, or rainwashed mud, or similar weather produced phenomena can rapidly collect, producing drifts extending across the track on one or both sides of the guide rail, which drifts may form to a depth sufficient to cause passing vehicles to cant over to an undesirably large angle while the drifts may severely obstruct the free passage of the guide means on the vehicle.

This problem of drifting snow, sand, mud or the like, is of course well known as applied to ordinary railways, in which the underside of the rail, particularly in the case of flat bottomed track, is substantially in contact with the upper surface of the ballast or with longitudinal rail bearers where these are employed, so that drifts form on one or both sides of one or both rails, but by reason of the clearance which exists between the lowest part of the vehicle and the track on either side of each rail on any railway drifting to quite a substantial depth must take place before any undesirable canting of a passing vehicle can occur.

In the case of a trackway of the above kind, however, the problem is quite different from that obtaining in the case of a railway, as even a slight drifting on the guide rail track on only one side of the guide rail must necessarily lead to a canting of the passing vehicle the extent of which rapidly increases with increased depth of drift. Furthermore, such

drifts can readily interfere with the free passage of the guide means on the vehicle, which guide means usually engages the sides of the guide rail over a greater vertical distance than is the case with the wheel flange on an ordinary railway.

With the foregoing considerations in mind in our aforesaid specification we have described as the invention forming the subject thereof the disposition of the guide rail above the wheel supporting surface of the track by a distance sufficient to permit of the snow, sand, mud or the like flowing freely or relatively freely between the underside of the rail and the track thereby reducing substantially the likelihood of drifts forming on either side of the rail, the rail being supported from the trackway by supports spaced apart longitudinally of the rail and whose dimensions in a direction longitudinally of the rail are small in comparison with the distance between adjacent longitudinally spaced supports.

From the difficulties which the invention of our specification aforesaid seeks to overcome it will be seen that there are definite limitations on the maximum vertical depth which can usefully be employed for the guide rail, the lateral sides of which are to be engaged by the guide means on the vehicle.

If this vertical depth is made too great the lateral sides of the guide rail will present a serious obstruction to drifting snow, sand, mud or similar weather produced phenomena so that the whole object of the invention to our aforesaid specification will be nullified.

On the other hand the minimum vertical depth of the guide rail must not be too small or inadequate guiding of the vehicle will result, and there will be serious danger of the vehicle canting laterally through an angle sufficient for the guide means engaging one of the lateral sides of the guide rail to be displaced to a position above the top of the guide rail with the result that the whole vehicle may be displaced laterally off the track.

Thus if the objects stated in our prior specification aforesaid are to be achieved variations in the vertical depth of the guide rail are relatively limited. At the same time for proper guiding of the vehicle against lateral movement it is, of course essential that the guide means should be in a position for engaging with each of the lateral sides of the guide rail.

In consequence of wear of the track itself and also of the peripheries of the vehicle wheels or tyres carried thereby the vertical position of the vehicle itself including its guide means is likely to be progressively displaced downwardly in relation to the guide rail with continued use of the vehicle, and unless the vertical depth of the guide means are made very substantial their upper ends may be displaced below the level of the top of the guide rail, and in consequence of the relatively limited maximum vertical depth of the guide rail which can be provided, the vertical depth of contact between the guide means and the lateral sides of the guide rail may then become insufficient for adequate guiding of the vehicle against lateral displacement.

The provision of guide means having more than certain overall vertical depth may be inconvenient as far as the design of the vehicle itself is concerned.

Furthermore, in consequence of the downward displacement of the guide means together with the rest of the vehicle which occurs after a period of use as above described, the lower end of the guide means may foul stones or other obstructions on the track adjacent one or both sides of the guide rail.

The present invention has for its object the provision of a wheeled vehicle embodying an improved form of guide means which is specially applicable for use with trackways of the particular kind forming the subject of our patent Specification aforesaid, and in which the disadvantages of existing guide means as applied to existing wheeled vehicles are avoided.

With this object in view according to the present invention the guide means comprise a pair of laterally spaced guide rollers mounted for rotation about laterally spaced vertical axes and provided with means for vertically adjusting the height of the rollers relative to the vehicle wheels so that in the event of wear of the periphery of the wheels, or of the wheel tyres or of the track occurring, the peripheries of the guide rollers can be maintained in the requisite vertical position for guiding engagement with their respective lateral sides of the guide rail irrespective of the limitation on the maximum vertical depth thereof and without likelihood of the lower ends of the guide rollers fouling obstructions on the track.

For instance, the guide rollers may be mounted rotatably in fixed vertical position upon vertically extending stub axles carried by part of the frame or chassis of the vehicle and provision may be made for adjusting the vertical position of these stub axles relative to the frame or chassis.

For example, the stub axles may be

threaded externally where they are connected to the frame or chassis and the connection may incorporate an adjusting nut or the equivalent whereby the stub axles together with the rollers carried thereby, may be vertically adjusted.

In one construction the rollers may be mounted upon eccentric pins provided at the lower ends of vertically extending stub axles as described in our provisional specification No. 4086/49 (Serial No. 676,775) of even date, and the upper ends of these stub axles may be threaded and be secured within internally threaded bushes carried upon parts of the vehicle frame or chassis at positions spaced laterally on either side of the longitudinal centre line thereof, and the upper end of the stub axle may project above the bush and carry a part of reduced section shaped to receive a spanner, screw driver or other tool, whereby the axle can be rotated within the bush and its vertical height adjusted.

Such rotation serves incidently to effect adjustment of the lateral position of the eccentric pin carrying the roller so as to vary the lateral position of the roller as is described in our aforesaid specification of even date.

Above the bush a lock nut may be provided for securing the axle in the adjusted position.

Preferably each vehicle would be provided with four such guide rollers, two being disposed on each side of the guide rail and the two rollers each side of the guide rail being spaced apart longitudinally of the vehicle.

Dated the 24th day of January, 1949.

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FIG.1.

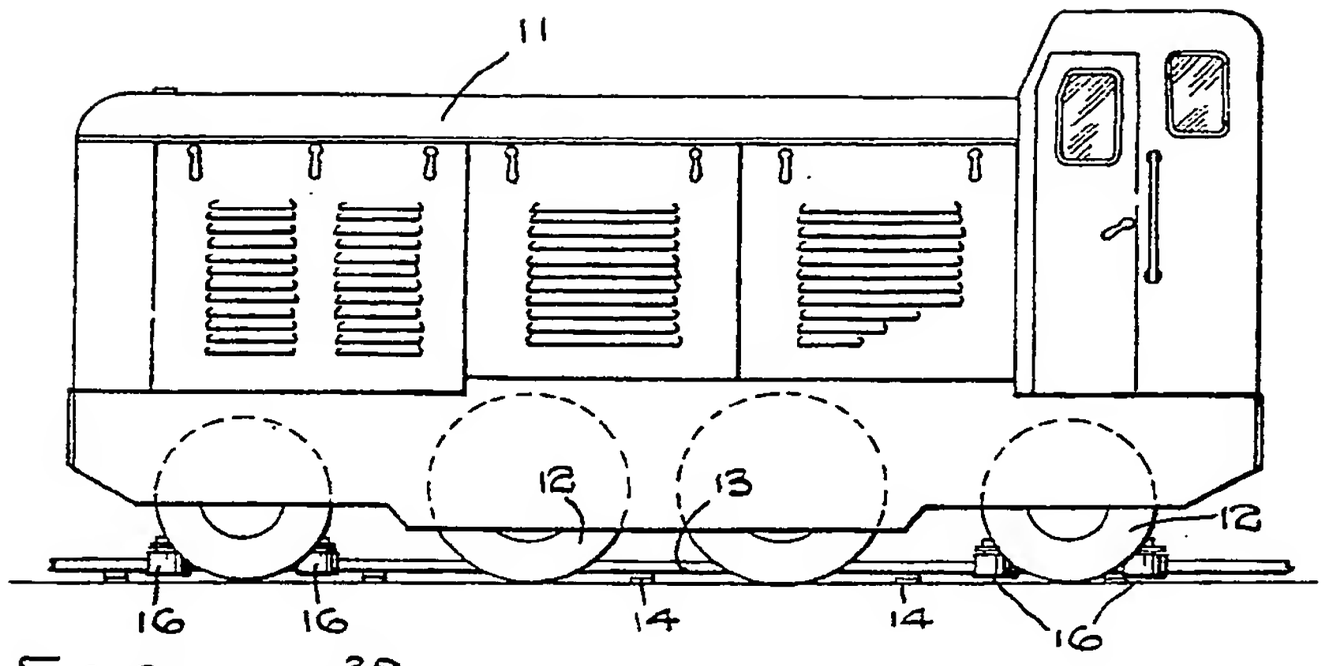


FIG.2.

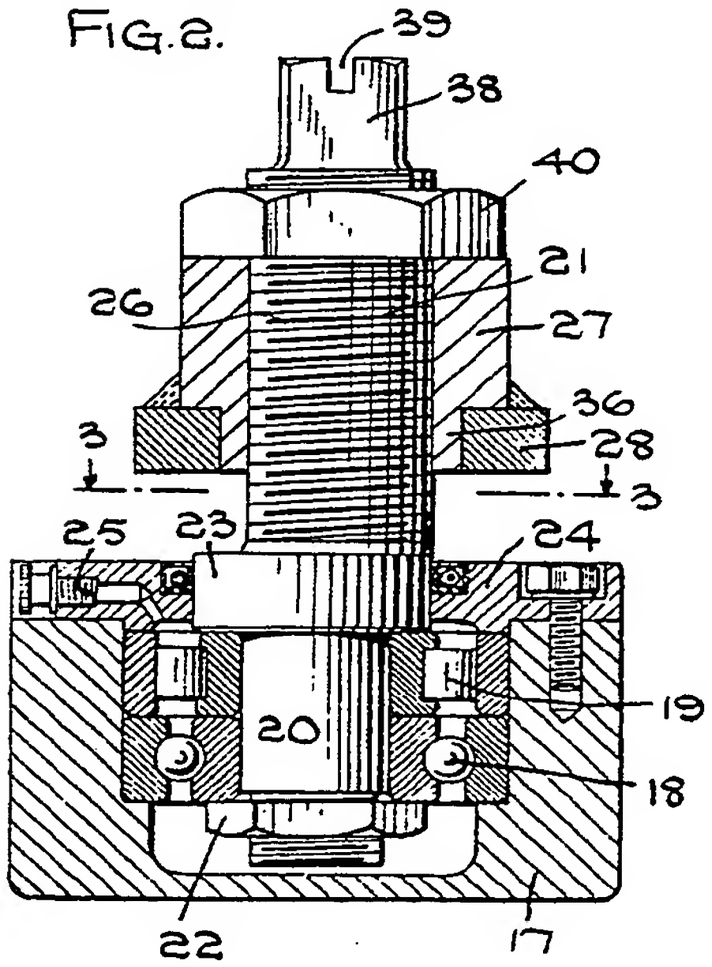
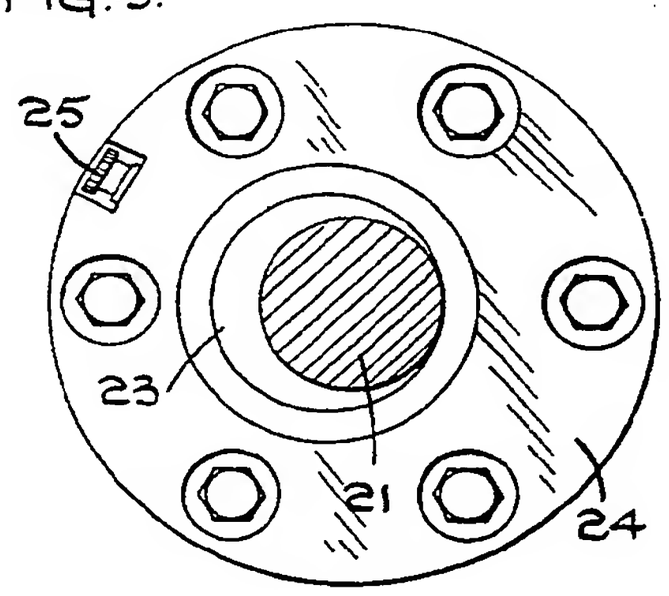


FIG.3.



676,774 COMPLETE SPECIFICATION

2 SHEETS *This drawing is a reproduction of the Original on a reduced scale.*

SHEETS 1 & 2

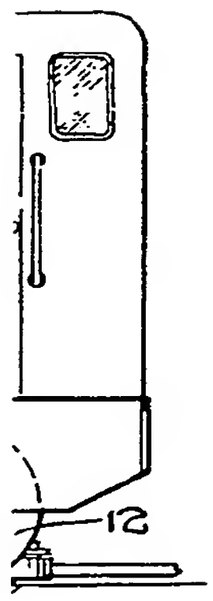


FIG.4.

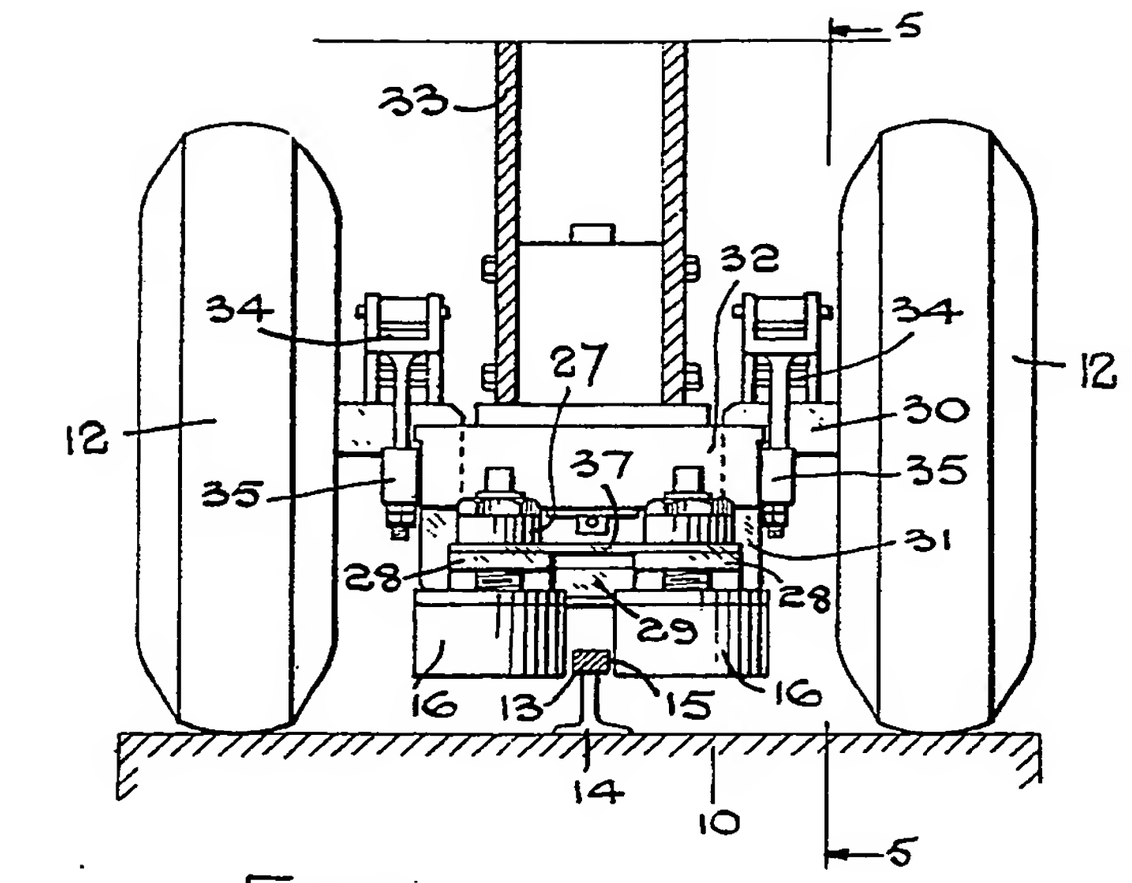
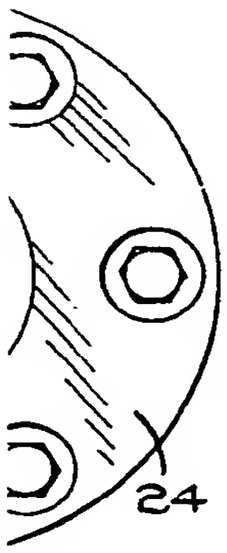
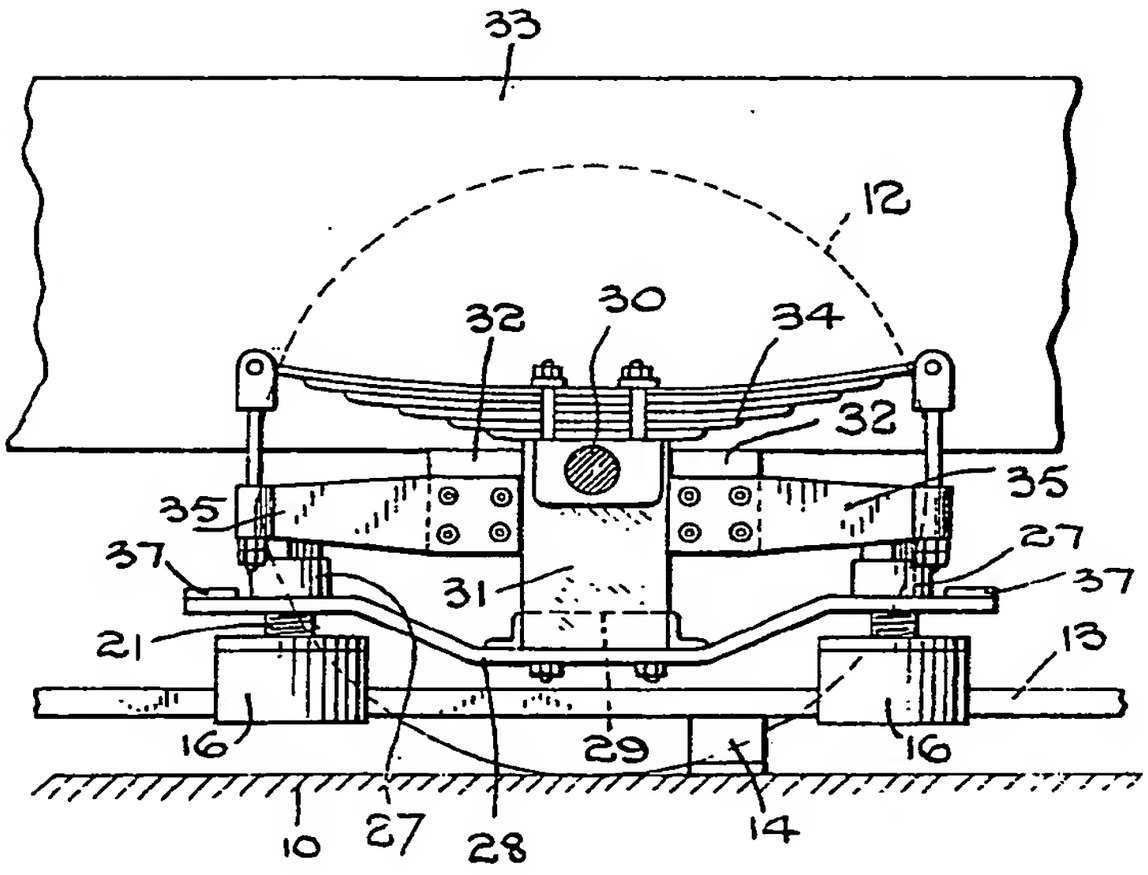


FIG.5





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676,774 COMPLETE SPECIFICATION

2 SHEETS This drawing is a reproduction of the Original on a reduced scale.

SHEETS 1 & 2

FIG.1.

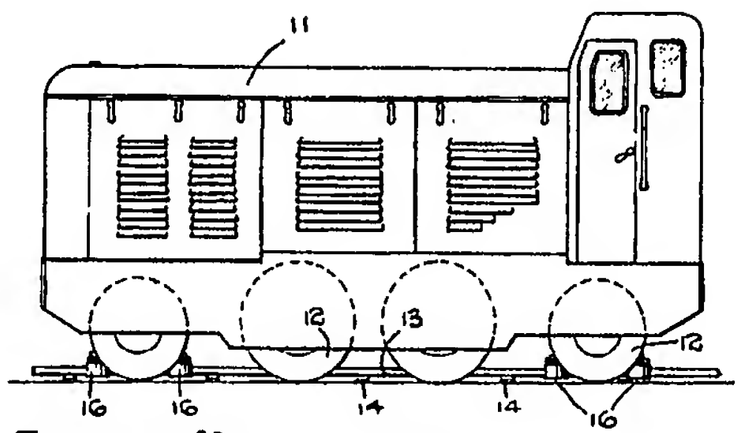


FIG.2.

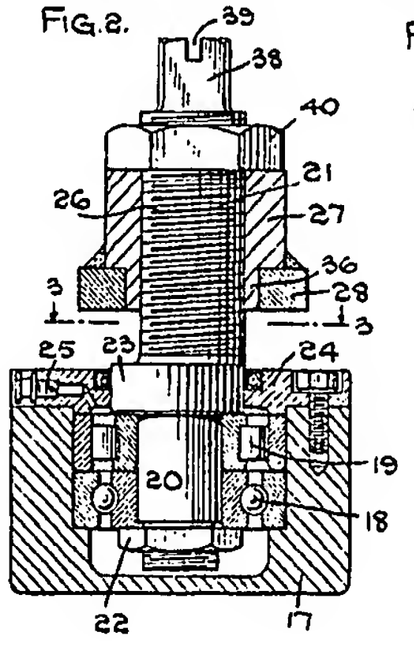


FIG.3.

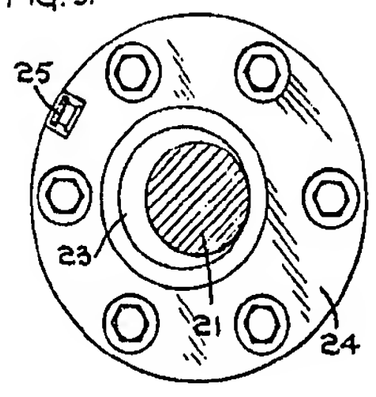


FIG.4.

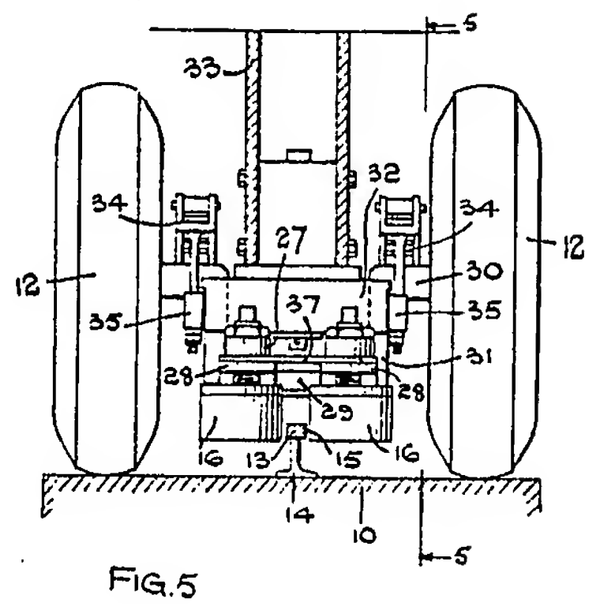
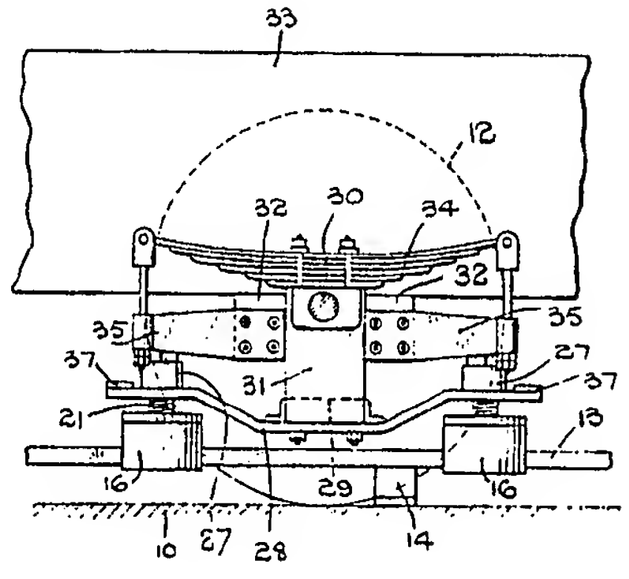


FIG.5



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